MP04TT1550

Dual Thyristor Water Cooled Welding Module

Preliminary Information

DS5467-1.1 June 2001

FEATURES

- Dual Device Module
- Electrically Isolated Package
- Pressure Contact Construction
- International Standard Footprint
- Alumina (Non Toxic) Isolation Medium
- Integral Water Cooled Heatsink

APPLICATIONS

- Welding

KEY PARAMETERS

V_{DRM}	**1800V**
$I_{LINE(cont.)}$	**1438A**
$I_{LINE(20cy./50\%)}$	**1670A**
$I_{TSM(per\ arm)}$	**14000A**
V_{isol}	**3000V**

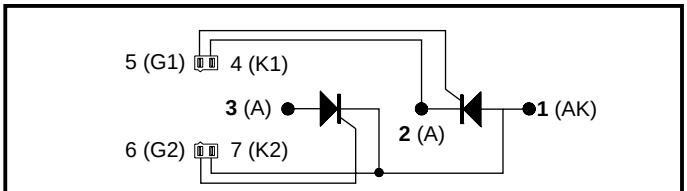


Fig. 1 TT Circuit diagram

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
MP04TT1550-18 MP04TT1550-17 MP04TT1550-16 MP04TT1550-15	1800 1700 1600 1500	T_{vj} = 0˚ to 125˚C, $I_{DRM} = I_{RRM}$ = 50mA $V_{DSM} = V_{RSM}$ = $V_{DRM} = V_{RRM}$ + 100V respectively

Lower voltage grades available

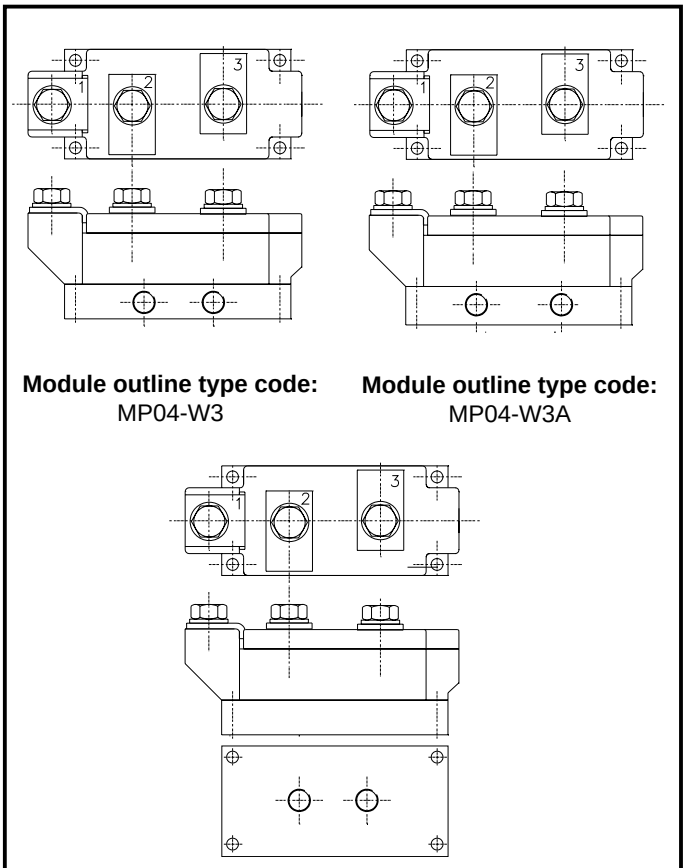
ORDERING INFORMATION

Order As:

MP04TT1550-XX-W2	1/4 - 18 NPT connection
MP04TT1550-XX-W3	1/4 - 18 NPT connection
MP04TT1550-XX-W3A	1/4 - 18 NPT water connection thread

XX shown in the part number about represents V_{DRM}/100 selection required, eg. MP04TT1550-17-W2

Note: When ordering, please use the complete part number.



Module outline type code: MP04-W3

Module outline type code: MP04-W3A

Module outline type code: MP04-W2

(See Package Details for further information)

Fig. 2 Module package variants - (not to scale)

ABSOLUTE MAXIMUM CURRENT RATINGS

Stresses above those listed under 'Absolute Maximum Ratings' may cause permanent damage to the device. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture of the package. Appropriate safety precautions should always be followed. Exposure to Absolute Maximum Ratings may affect device reliability.

Symbol	Parameter	Test Conditions		Max.	Units
I_{LINE}	Max. controllable RMS line current - single phase	Continuous 50/60Hz 4.5 Ltr/min	$T_{water\ (in)}$ = 25˚C	1438	A
			$T_{water\ (in)}$ = 40˚C	1280	A
		20 cycles, 50% duty cycle 4.5 Ltr/min	$T_{water\ (in)}$ = 25˚C	1860	A
			$T_{water\ (in)}$ = 40˚C	1670	A
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, T_j = 125˚C		14	kA
I^2t	I^2t for fusing	V_R = 0		$0.975X10^6$	A^2s
I_{TSM}	Surge (non-repetitive) on-current	10ms half sine, T_j = 125˚C		11.2	kA
I^2t	I^2t for fusing	V_R = 50% V_{DRM}		$0.625X10^6$	A^2s
V_{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz		3000	V

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
$R_{th(j-W)}$	Thermal resistance - junction to water (per thyristor)	dc, 4.5 Ltr/min	-	0.102	˚C/kW
		Half wave, 4.5 Ltr/min	-	0.106	˚C/kW
		3 Phase, 4.5 Ltr/min	-	0.112	˚C/kW
T_{vj}	Virtual junction temperature	Reverse (blocking)	-	125	˚C
T_{stg}	Storage temperature range	-	–40	125	˚C
-	Screw torque	Mounting - M6	6(53)	-	Nm (lb.ins)
		Electrical connections - M10	-	12(106)	Nm (lb.ins)
-	Weight (nominal)	-	-	Refer to drawings	g

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_j = 125˚C	-	50	mA
dV/dt	Linear rate of rise of off-state voltage	To 67% V_{DRM}, T_j = 125˚C	-	1000	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 500A, gate source 10V, 5Ω t_r = 0.5µs, T_j = 125˚C	-	500	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125˚C	-	0.85	V
r_T	On-state slope resistance	At T_{vj} = 125˚C	-	0.38	mΩ

Note: The data given in this datasheet with regard to forward voltage drop is for calculation of the power dissipation in the semiconductor elements only. Forward voltage drops measured at the power terminals of the module will be in excess of these figures due to the impedance of the busbar from the terminal to the semiconductor.

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25°C	3.5	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	200	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°C	0.25	V
V_{FGM}	Peak forward gate voltage	Anode positive with respect to cathode	30	V
V_{FGN}	Peak forward gate voltage	Anode negative with respect to cathode	0.25	V
V_{RGM}	Peak reverse gate voltage	-	5	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	10	A
P_{GM}	Peak gate power	See table fig. 5	150	W
$P_{G(AV)}$	Mean gate power	-	10	W

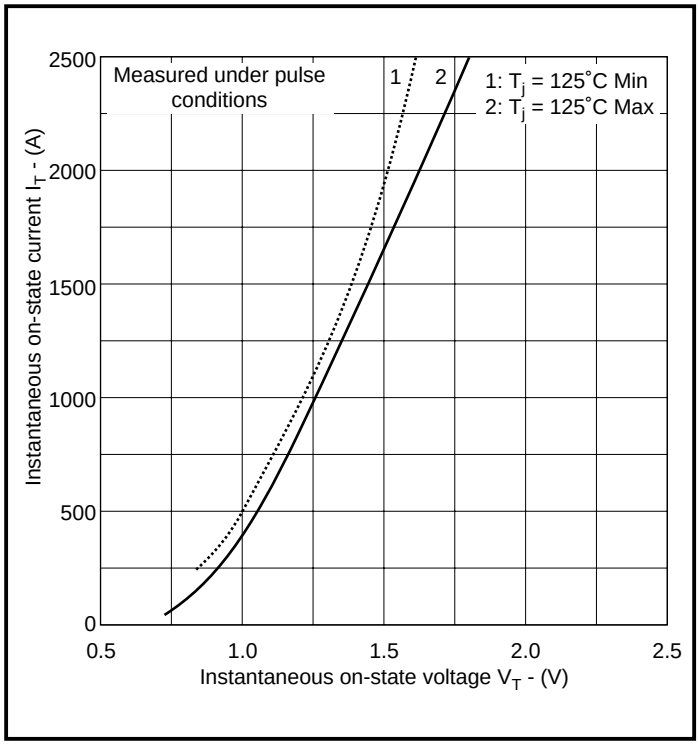


Fig. 3 Maximum (limit) on-state characteristics

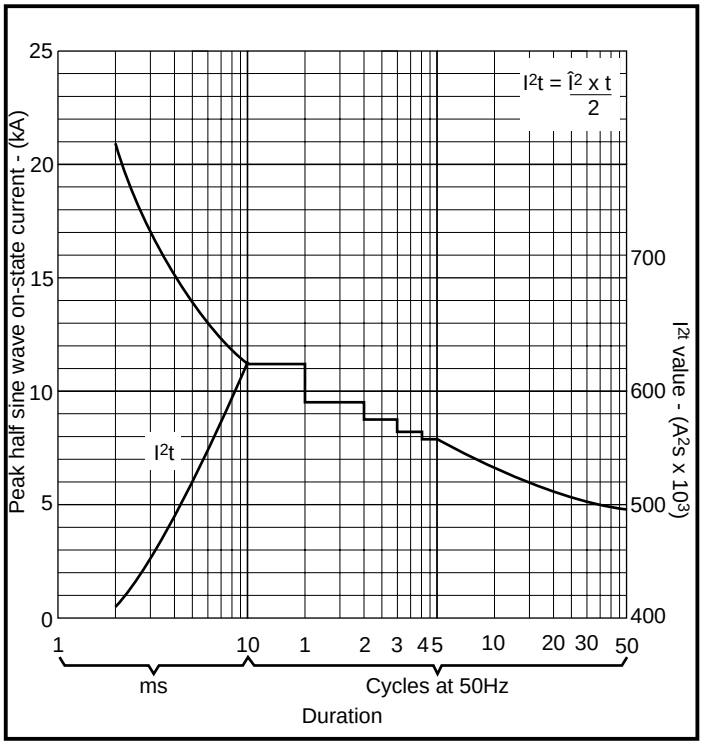


Fig. 4 Surge (non-repetitive) on-state current vs time (with 50% V_{RSM} at T_{case} = 125˚C)

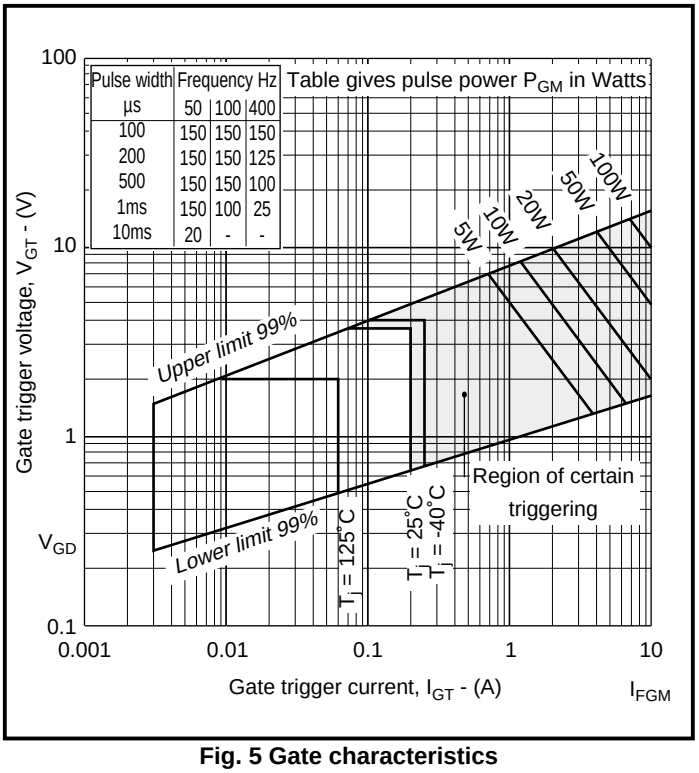


Fig. 5 Gate characteristics

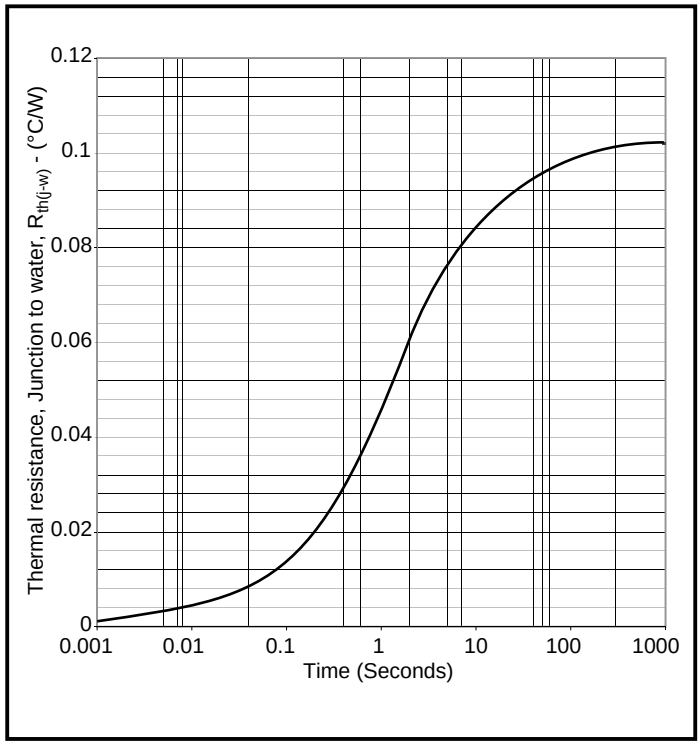


Fig. 6 Transient thermal impedance - dc

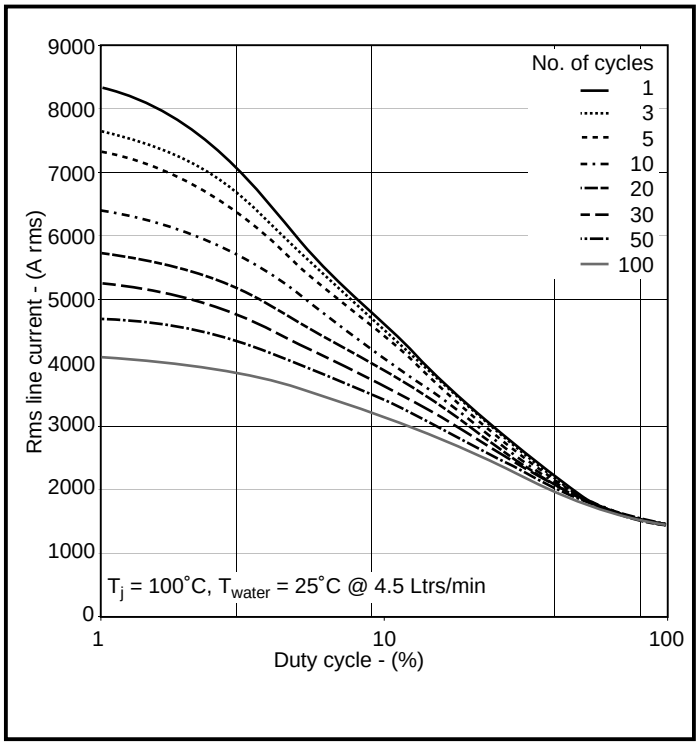


Fig. 7 Single phase welding rating @T_{water} = 25˚C

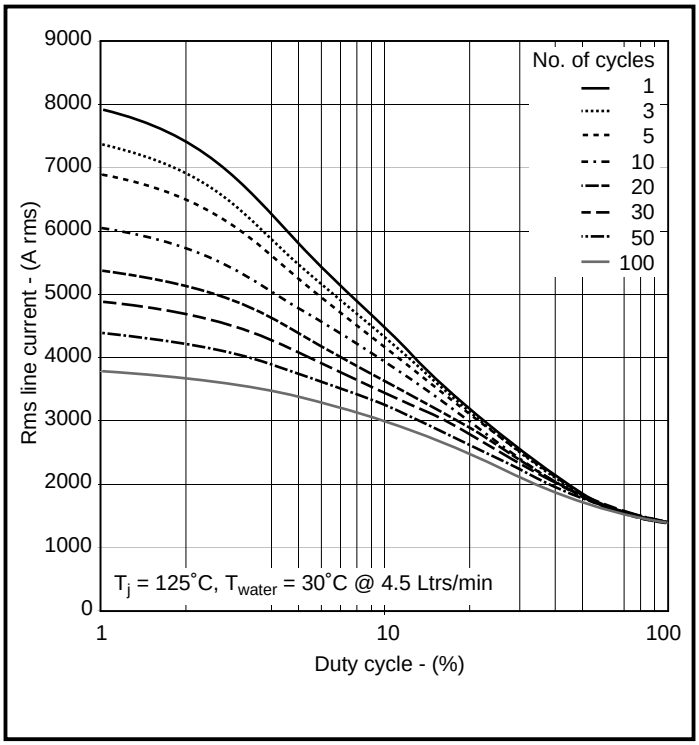


Fig. 8 Single phase welding rating @T_{water} = 30˚C

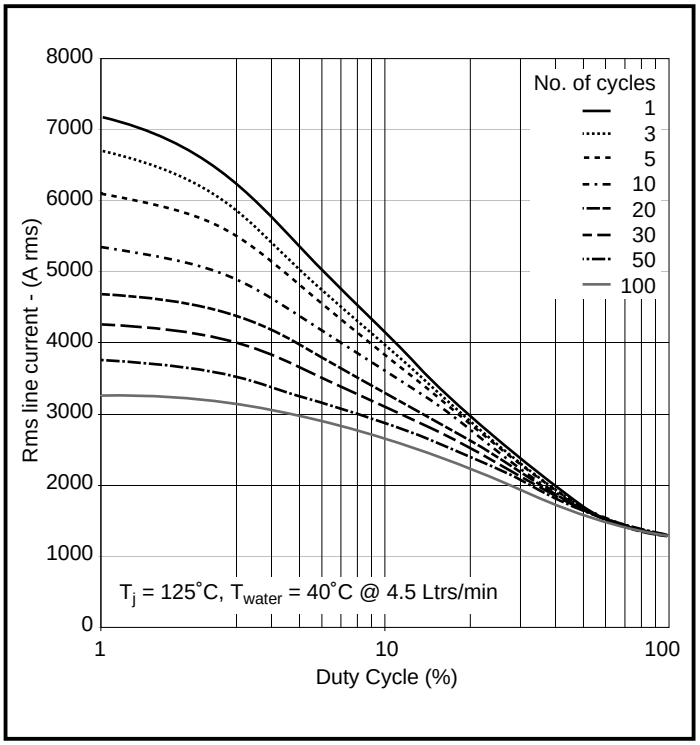


Fig. 9 Single phase welding rating @T_{water} = 40˚C

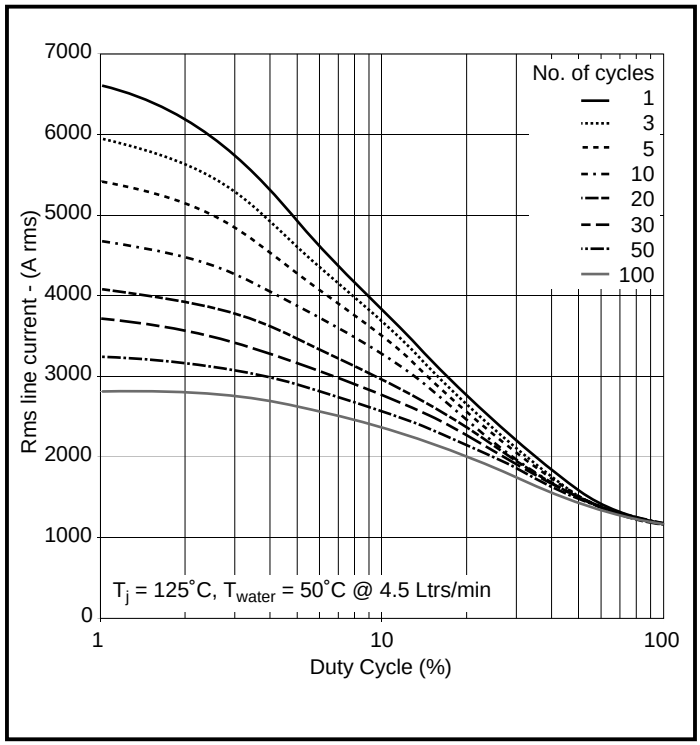


Fig. 10 Single phase welding rating @T_{water} = 50˚C

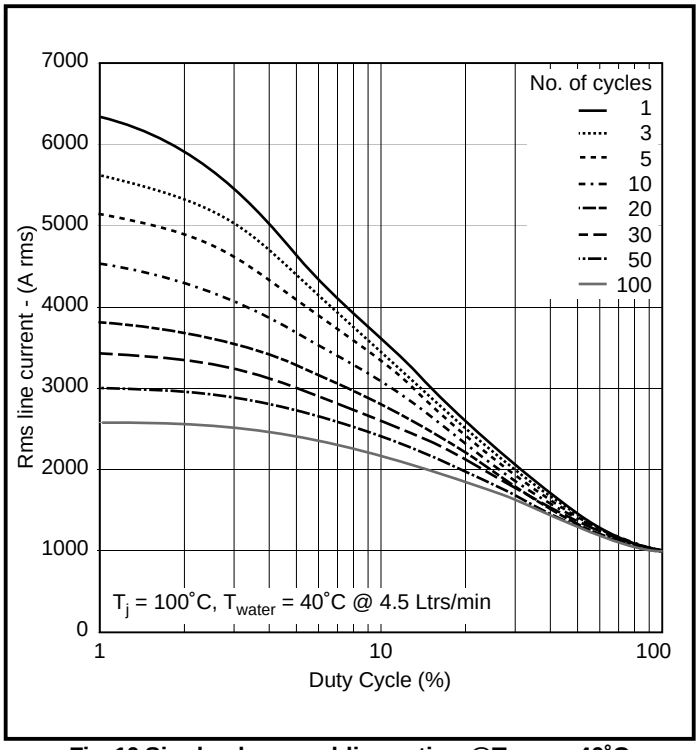
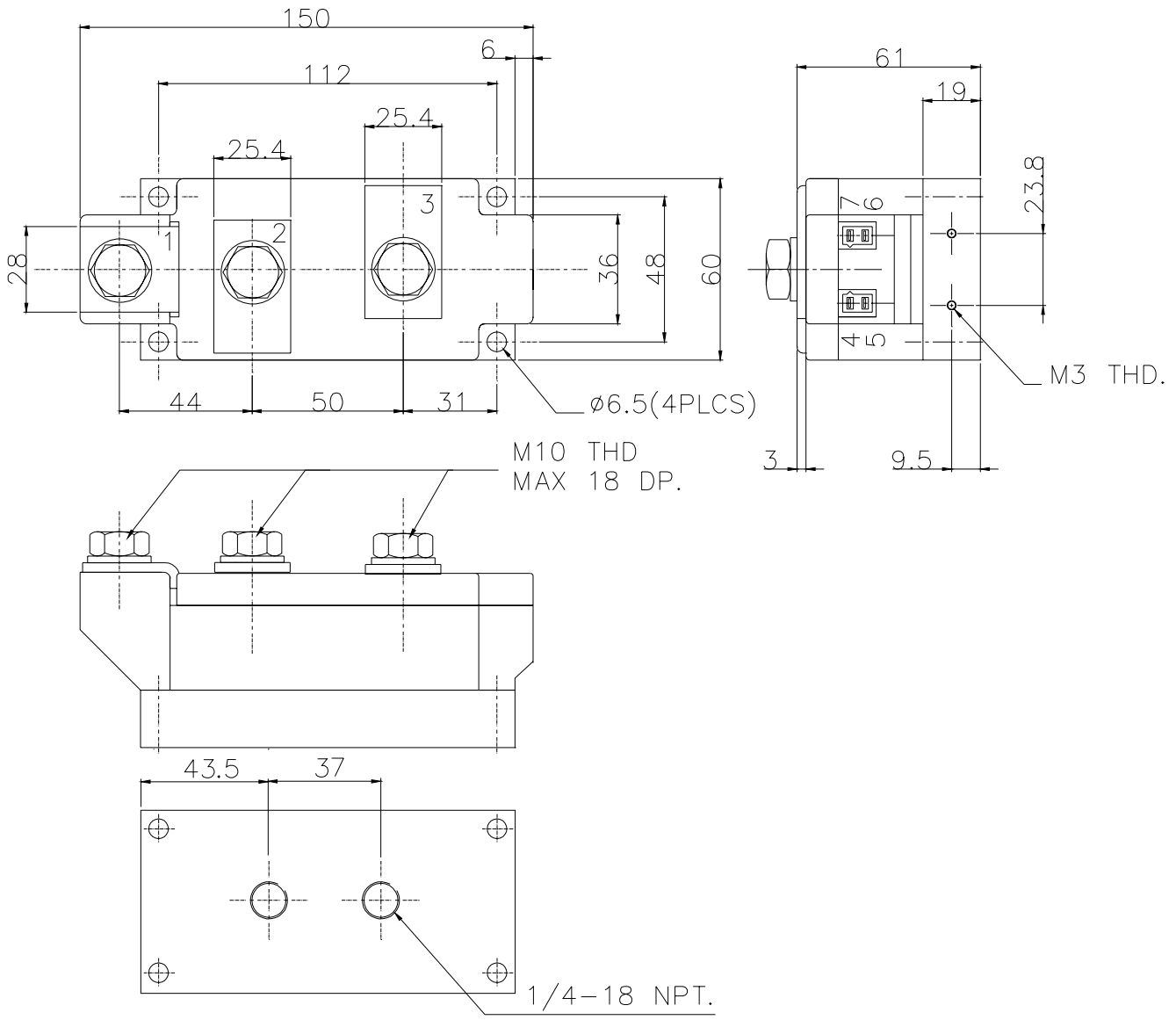


Fig. 10 Single phase welding rating @T_{water} = 40˚C

PACKAGE DETAILS

For further package information, please visit our website or contact your nearest Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Recommended fixings for mounting: M6 socket head cap screws
Nominal weight: 2060g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP04-W2

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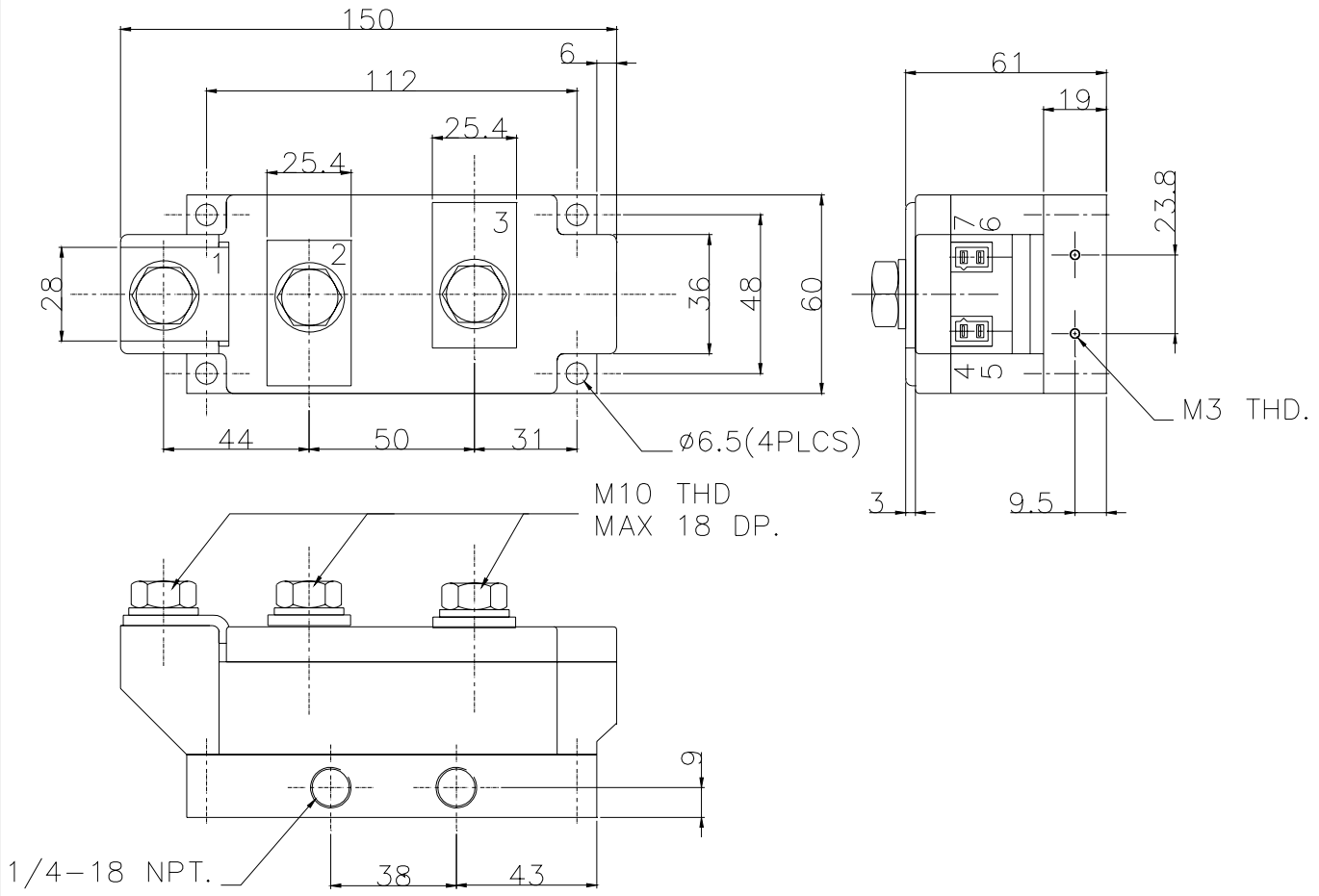

Recommended fixings for mounting: M6 socket head cap screws
Nominal weight: 2060g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP04-W3

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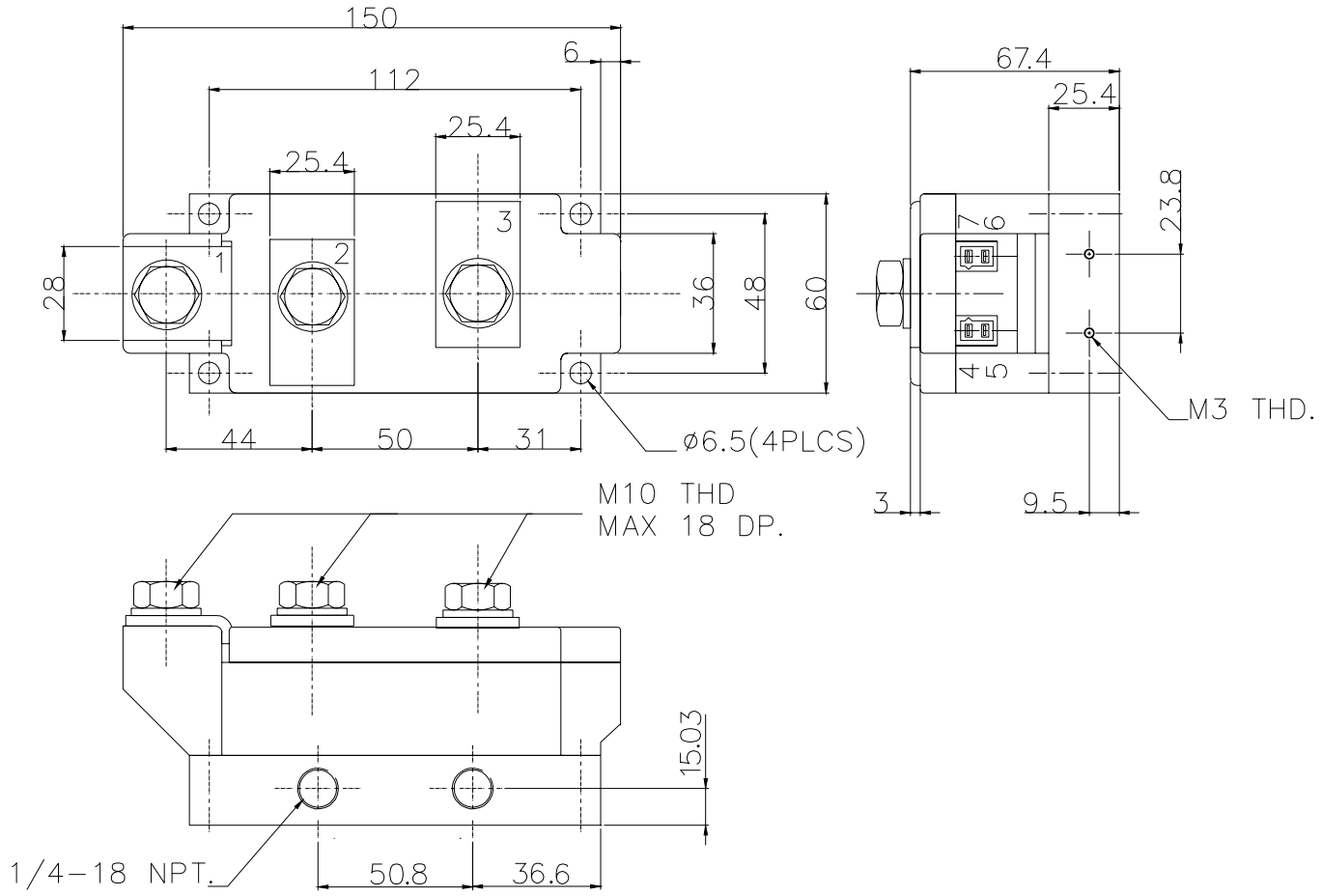

Recommended fixings for mounting: M6 socket head cap screws
Nominal weight: 2530g
Auxiliary gate/cathode leads not supplied as standard, but maybe purchased separately.

Module outline type code: MP04-W3A

POWER ASSEMBLY CAPABILITY

The Power Assembly group provides support for those customers requiring more than the basic semiconductor switch. Using CAD design tools the group has developed a flexible range of heatsink / clamping systems in line with advances in device types and the voltage and current capability of Dynex semiconductors.

An extensive range of air and liquid cooled assemblies is available covering the range of circuit designs in general use today.

HEATSINKS

The Power Assembly group has a proprietary range of extruded aluminium heatsinks. These were designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or customer service office.

http://www.dynexsemi.com

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Target Information: This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

No Annotation: The product parameters are fixed and the product is available to datasheet specification.